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ABSTRACT

This teaching module explains how the U.S. banking system uses excess reserves to create money in the form of new deposits for borrowers. The module is part of a computer-animated series of four-to-five-minute modules illustrating standard concepts in high school economics. Although the module is designed to accompany the video program, it may be used independently. An "Economic Content" section provides teachers with supplemental economic background information to facilitate the use of the materials in the classroom. "Before the Viewing" activities introduce students to the concept of how banks create money and enhance their comprehension when viewing the program. "After the Viewing" activities expand upon the concepts presented in the video and, through classroom discussions, an interactive simulation, and student worksheets, give students a chance to practice their understanding of how banks create money. (BT)

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ED 436 452

A to Z

How Banks Create Money

Lyndi Beale

Grade Levels: 9,10,11,12

Document Type: Lesson Plans

Description:

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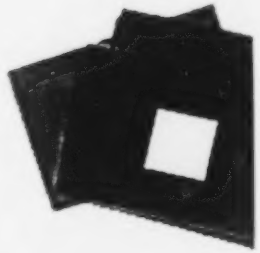

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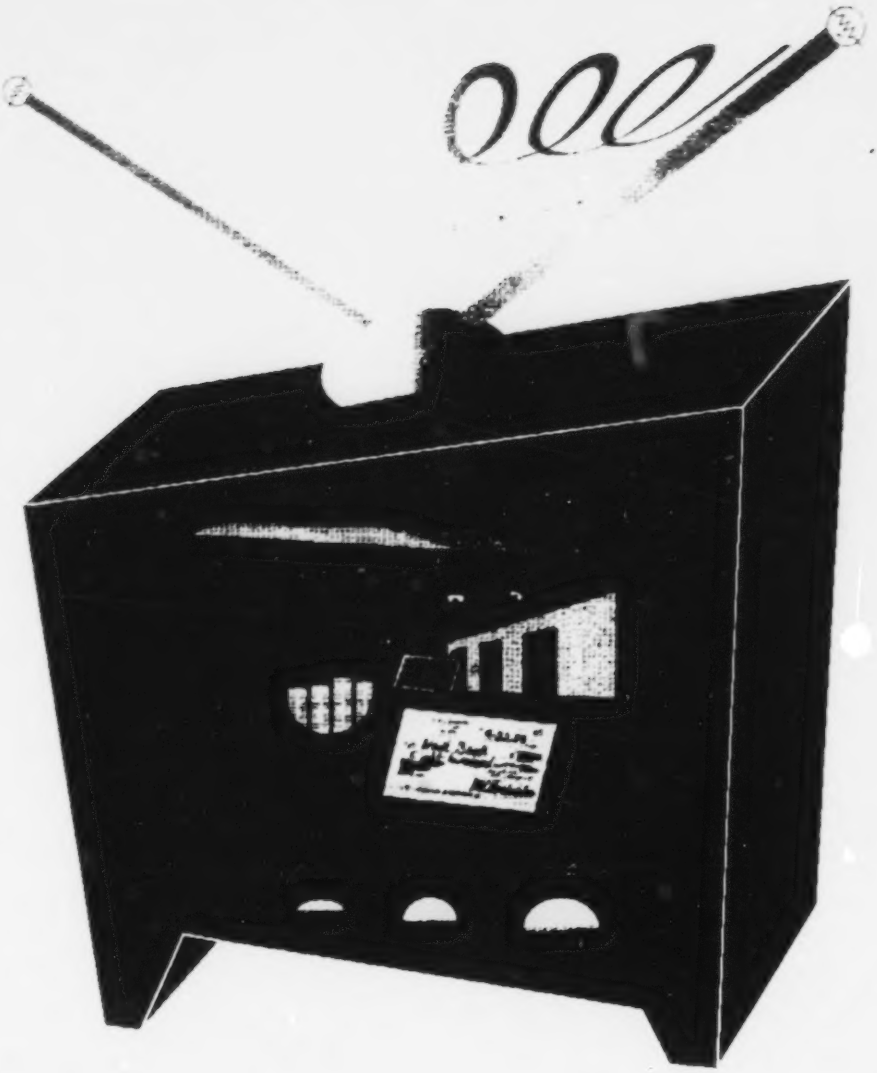


HOW BANKS CREATE MONEY

THE VIDEO PROGRAM

How Banks Create Money is part of a computer animated series of four to five minute modules illustrating standard concepts in high school economics.

This module illustrates how banks increase the supply of money through their lending activities which create money in the form of new checking deposits. This process is called **multiple deposit creation.**

Viewers follow a stream of money into a bank vault where the concepts **required reserves** and **excess reserves** are defined. A stream of checks, representing the money created through new loans, lead the viewer out of the bank vault.

A second sequence graphically illustrates the process of new money creation. An initial deposit in a single bank triggers a series of new loans and deposits throughout the entire banking system. This process continues until all excess reserves have been absorbed into required reserves. Ultimately, the amount of new checkbook money created through lending will be a multiple of the initial deposit.

THE CURRICULUM MATERIALS

The **How Banks Create Money** curriculum materials are designed to accompanythe video program, but may be used independently depending upon a teacher's particular needs. An **Economic Content** section provides teachers with supplemental economic background information to facilitate the use of the materials in the classroom. **Before the Viewing** activities introduce students to the concept of how banks create money and enhance their comprehension when viewing the program. **After the Viewing** activities expand upon the concepts presented in the video and give students a chance to practice their understanding of how banks create money through classroom discussions, an interactive simulation, and student worksheets.

ECONOMIC CONTENT

Commerical banks play a crucial role in the expansion and contraction of the supply of money and credit in our economy. Through their lending activities, banks increase or decrease the checking deposit component of the money supply. Checking deposits make up the largest portion of our money supply.

Economists have defined numerous measures of the money supply to pinpointthe impact of money supply changes on our economy's health. M1 is the basic measure of our money supply. M1 includes coins and currency in people's hands plus the funds available in checking accounts. M1 functions as the primary medium of exchange in

our economy. M2 is a broader definition of the money supply and includes M1 plus savings accounts, certificates of deposit, and money market funds.

Banks operate under a fractional reserve system which means they are requiredby law to set aside a fraction of their customers' deposits as **required reserves.** Banks may lend an amount equal to their remaining reserves which are called **excess reserves.** Banks earn revenue and profits through lending and charging interest on loans. They also increase or decrease the checking deposit component of the money supply through lending.

The process whereby banks make loans equal to the amount of their excess reserves and create new checkbook money is known as **multiple deposit creation.** Each time a bank receives a deposit, it sets aside some of it to meet reserve requirements and may lend an amount equal to the remaining excess reserves. These loans take the form of new checking accounts for the borrower which increases the checkbook portion of the money supply. When the borrower spends the loan, he or she writes a check on the new checking account. The recipient of the check, in turn, deposits his or her funds into another bank. After this second bank sets aside its required reserves againstthe new deposit, it may lend an amount equal to its remaining excess reserves. These loans also take the form of new checking accounts for the borrowers, and each successivecycle of lending generates an increase in the money supply in the form of these new checkbook dollars. Additionally, with each round of new deposit creation, there are fewer excess reserves. The deposit creation process is multiplied throughout the entire banking system until all excess reserves have been absorbed into required reserves.

WHERE DOES THE INITIAL DEPOSIT COME FROM

Where does the initial infusion of new deposits come from to trigger the multiple deposit creation process? There are two main sources of funds for the initial deposit. People holding coins and currency may decide to hold fewer of their assets in this form, and deposit their cash into a bank creating one new source of bank reserves. The other and primary source of new funds results from the actions of the Federal Reserve.

The Federal Reserve sets reserve requirements and supervises the lending activities of commercial banks. Congress created the Federal Reserve System in 1913 to oversee these activities along with the Fed's important responsibility of conducting monetary policy. The amount of money circulating in the economy influences spending which, in turn, affects production, prices and economic growth. In conducting monetary policy, the Federal Reserve seeks to target money growth rates which promote stable prices, high employment, and steady economic growth. Too much spending in the economy can lead to inflation or higher prices if production cannot grow enough to keep up with the aggregate demand for goods and services. Too little spending may dampen the economy and fuel a recession.

Influencing the amount of excess reserves in the banking system that are available for lending is the principle mechanism by which the Fed implements monetary policy. The Fed has three monetary policy tools to affect the amount of excess reserves: **open market operations,** altering the **discount rate,** and changing **reserve requirements.**

Open market operations is the Fed's primary tool forfine-tuning the moneysupply. Through its open market operations, the Federal Reserve buys and sells U.S. government securities on the open or secondary market. These government securities were originally issued and sold by the U.S. Treasury Department. When the Fedbuys securities from securities dealers, it writes a check on itself and credits the dealer's bank's reserve account with the Fed. The dealer's bank, in turn, credits the dealer's checking account for the same amount which increases the checking deposit component of the money supply. By purchasing securities, the Fed has increased the money supply by the amount of the purchase and also has increased the amount of reserves in the banking system that are available for lending and multiple deposit creation. Note that by writing a check against itself, the Fed has increased the amount of money in the economy. In contrast, when individuals or businesses write checks, their accounts decrease while the recipients' accounts increase — the total amount of checkbook money in the economy remains the same.

When the Fed sells securities on the open market, reserves are withdrawn fromthe banking system which decreases the total amount of excess reserves available to use as a guideline for lending. This triggers a multiple contraction of the moneysupply and checking deposit destruction.

The Fed alters **reserve requirements** to stabilize the amount of checkbook money banks can create. In practice, the Fed rarely alters reserve requirements because of the disruptive impact this would have on bank lending activites and the money supply if banks were constantly required to make adjustments to their reserve holdings.

As with reserve requirements, The Fed infrequently alters the **discount rate** as a monetary policy tool. The discount rate is the interest rate at which commercial banks borrow from the Fed. Changing the discount rate is an inefficient mechanism for impacting reserves in the banking system because it's hard to gauge how much banks will borrow from the Fed. The primary purpose of this policy tool is to provide a safety net for the banking system by preventing a bank's temporary deficiency in required reserves from triggering a major financial crisis. Banks which are temporarily unable to meet their day-to-day reserve requirements can borrow from the Fed's discountwindow.

Figure 1 illustrates the money creation process from the Fed's securitiespurchase through the multiple cycles of lending and deposit creation. In this example,the Federal Reserve Bank purchases $20,000 worth of U.S. Treasury Securities from XYZ Securities Dealers. To pay XYZ, the Fed credits XYZ's Bank's reserve account (First Bankof the U.S.) for $20,000. First Bank of the U.S. then credits XYZ's checking

accountwith a $20,000 deposit. The Fed's purchase has introduced $20,000 new reserves into the banking system, and increased the checkbook portion of the money supply in the form of XYZ's $20,000 new checking deposit at First Bank.

If the reserve requirement is 10 percent, First Bank will set aside $2,000 asrequired reserves and lend an amount equal to the remaining $18,000 excess reserves. Note that First Bank's required reserves plus its excess reserves equal its total reserves. In this simplified example, let's assume that every bank lends an amount equal to itstotal excess reserves in a single loan transaction.

First Bank decides to approve an $18,000 loan for Gordo's Taqueria, one of its creditworthy customers which wants to remodel its restaurant. First Bank credits Gordo's checking account for $18,000 increasing the checkbook portion of the money supply. Gordo's writes a check on this account payable to Able Construction company, the remodeling contractor. Able Construction, in turn, deposits this check into its account at Second Bank. Note that Able's new deposit doesn't increase the checkbook portion of the money supply because the new deposit is offset by the withdrawal of funds from Gordo's account to pay Able.

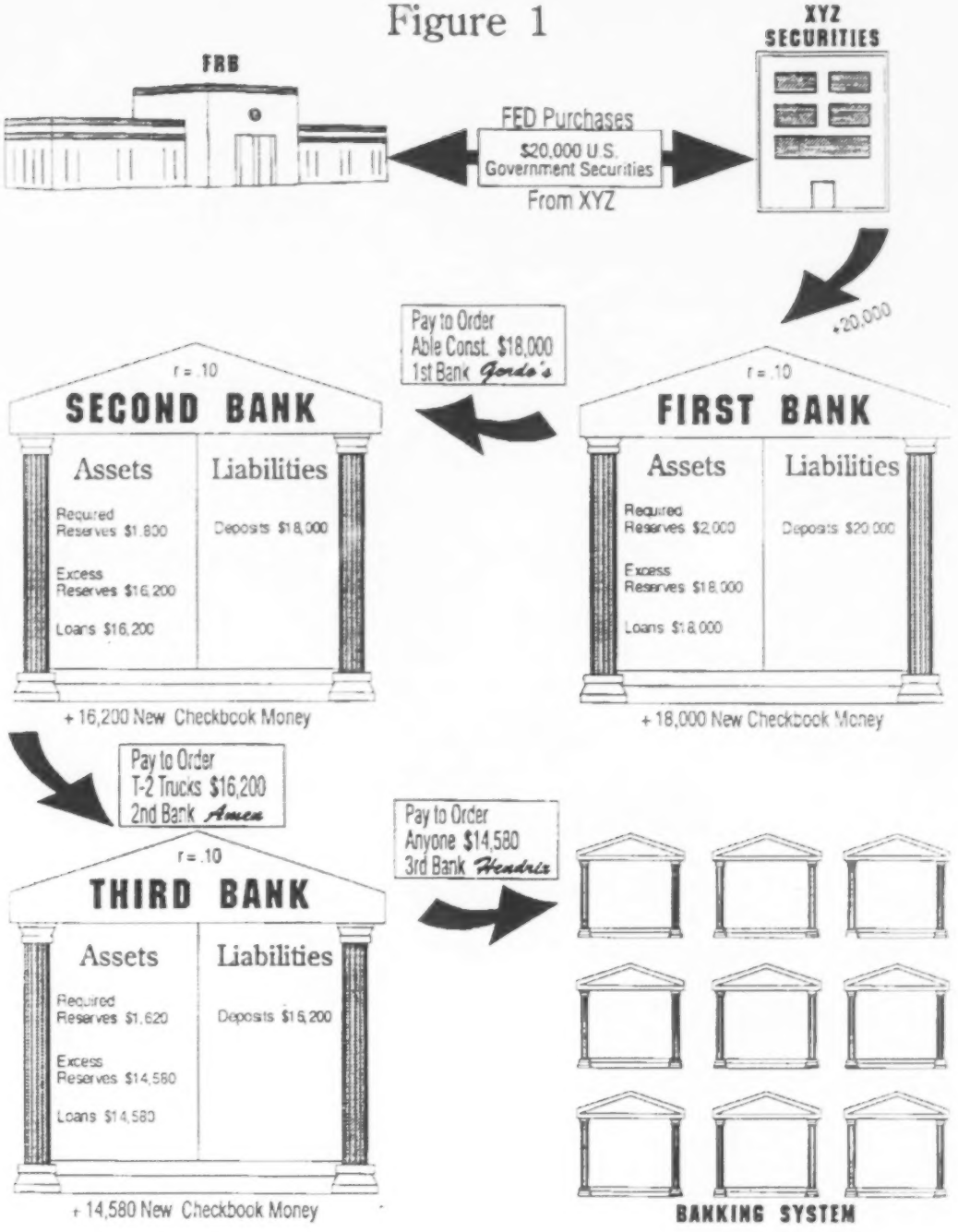
Second Bank's deposits now have increased by $18,000. Out of this $18,000, Second Bank must hold $1,800 as required reserves and may lend an amount equal to its $16,200 remaining excess reserves. Second Bank approves a loan for one of its customers, Amen Tires, which has decided to purchase another truck for its mobile tire repair fleet. Second Bank credits Amen Tires' checking account for $16,200. Amen, in turn, writes a check on its account payable to T-2 Trucks which deposits the check into Third Bank. This multiple deposit creation continues with Third Bank setting aside $1,620 as required reserves and lending an amount equal to its remaining excess reserves of $14,580. The total amount of newly created checkbook money resulting from the Federal Reserve's securities purchase and three rounds of lending equals $68,780 with First Bank contributing, $18,000, Second Bank contributing $16,200, and Third Bank contributing $14,580. In addition to the $48,780 of new checkbook money, the money supply increased by the $20,000 deposit in XYZ's checking account which resulted from the Fed's securities purchase. The multiple expansion process continues throughout the entire banking system until all of the excess reserves have been absorbed into required reserves.

A sale of securities by the Federal Reserve would have the opposite amplifiedimpact on the checking deposit component of the money supply. A sale of securities withdraws reserves from the banking system and triggers a contraction of the money supply in the form of deposit destruction.

In this example, we've assumed that all the money from the initial infusion of new reserves remained in checking accounts and that each bank lent an amount equal to its total excess reserves. In reality, it's possible that individuals who receivechecks will decide to hold onto their cash rather than deposit the full amount of their checks into a bank checking account. This leakage would reduce the amount of new checkbook

money that can be created by reducing the amount of excess reserves used as a guideline for lending. If banks decide to keep more than their required reserves, this also would decrease the amount of new checkbook money that can be created. Aslong as interest rates are above zero and there are creditworthy borrowers, banks have an incentive to lend since they earn no interest on reserves which sit idle in their vaults or in reserve accounts at the Fed.

Figure 1



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BEFORE THE VIEWING ACTIVITIES

Tell your students that they are going to watch a program explaining how banks create new checkbook money in the economy by making loans. Review the M-1 measure of the money supply — coins and currency in people's hands plus the amounts people have in their checking accounts. Explain that the process of money creation takes place by changing the amounts in people's and business' checking accounts. Emphasize that checks themselves aren't considered money, but a means of transferring checking account funds.

Point out that the U.S. banking system operates under a **fractional reserve system** which means banks are required to keep only a fraction of their deposits on hand in their vault or in an account with the Federal Reserve. They may make loans equal tothe remaining balance of the deposit. To illustrate this concept and the money creation process, develop a discussion tracing a few loan transactions through the banking system. For example, tell your students that you are the president of the First Bank of Big Bucks, and you have just received a new deposit of $1,000 of which, by law, you must keep 10 percent or $100 on hand in your vault or on deposit with the Federal Reserve. You are allowed to loan an amount equal to the balance of the deposit. Ask the class how much money you may loan out ($900). As the president of First Bank of Big Bucks, you are willing to extend a $900 loan to anyone in the class<ellipsis>any takers? What does he or she want to buy with the $900 loan? Tell the borrower that you will open a new checking account for him or her for $900, the amount of the loan. Ask the class what impact this loan transaction had on the money supply, reviewing the M1 measure of the money supply if necessary. (The money supply has increased by $900 in new checkbook money because the loan took the form of a new checking account for the borrower.)

Trace the path of thisloan transaction and a few subsequent loans for your class as illustrated in **Figure 2.** After your student borrower spends his or her loan by writing a check for $900, the check's recipient deposits the funds into the Second Bankof Big Bucks. Second Bank retains 10% of the $900 new deposit, and loans the remaining $810 to another student. The cycle of lending and checkbook money creation continues as this student writes a check which is deposited by its recipient into ThirdBank.

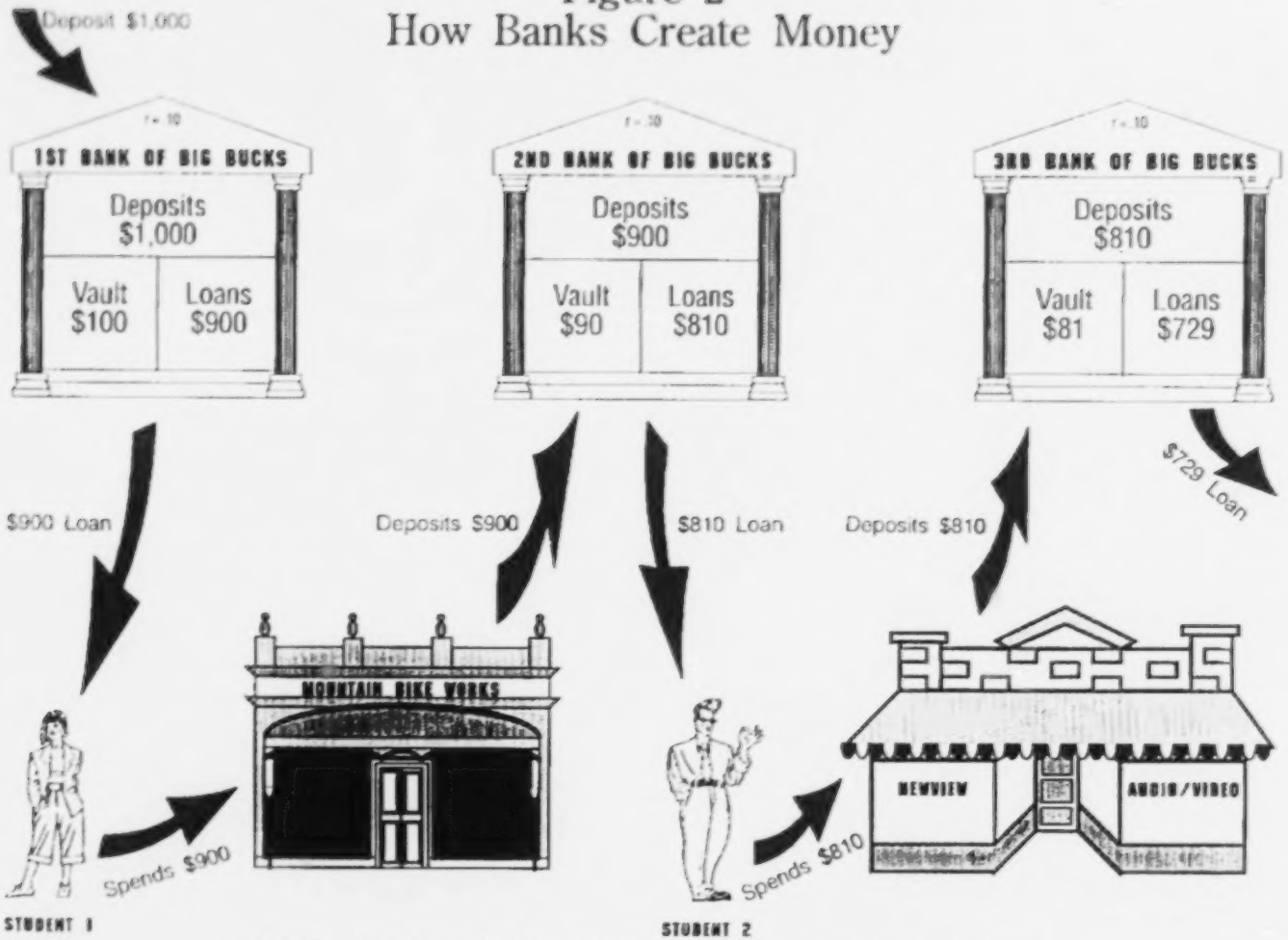
Ask the class how much new checkbook money was added to the money supply with each loan transaction ($900 + $810 + $729 = $2,439). Explain that this process is multiplied throughout the entire banking system as banks make loans equal to the amounts they are not required to keep in their vaults or in an account with the Federal Reserve.

Explain to the class that in the real world, none of the classroom banks would be in business for very long since all loans were extended without reviewing the creditworthiness of the borrowers. As the module points out in its opening sentence, "Banks are in the business of making loans." By lending and charging intereston their

loans, banks earn revenue and profit. Ask the class tolisten for the definitions of the following terms as they view the program:

1. **Required Reserves** — Fraction of customers' deposits that banks are required by to keep on hand in their vault or with the Federal Reserve Bank.
2. **Excess Reserves** — Fraction of customers' deposits beyond required reserves which form the basis for bank loans.

Figure 2
How Banks Create Money



($900.00 + 810.00 + 729.00 = $2,439.00 new checkbook money created)

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AFTER THE VIEWING ACTIVITES

Reintroduce the concept, **fractional reserve system.** Ask the class to explain what this term means incorporating the definitions of **required reserves** and **excess reserves** in their explanation. Include these definitions as you review the mechanics of the money creation process using the video's one bank economy with its $1,000 initial deposit as a model for the discussion. Emphasize the following points in your discussion:

1. Banks create money by creatingnew checking deposits for borrowers when making loans. The total quantity of coins and currency does not change. The expansion in the money supply takes place through additions to checkbook money.
2. Checking account funds constitute money, not checks themselves.
3. The money creation process takes place because the U.S. operates under a **fractional reserve system.** Reserve requirements limit the amount of new checkbook money that can be created. Multiple deposit creation takes place until all excess reserves have been absorbed into the banking system's required reserves. For example, in **Figure 1** the amount of money available for lending decreased with every subsequent loan transaction as excess reserves were absorbed into the classroom banking economy's required reserves.

ACTIVITY 1 - HOW BANKS CREATE MONEY SIMULATION

OBJECTIVES

Students will be able to:

1. Understand how banks create new checkbook money through lending.
2. Explain how the M1 measure of the money supply changes as a result of the money creation process.

MATERIALS

- Three Bank and Three Vendor Transaction Sheets; One Borrower Record Sheet
- Large Sheets of paper or blackboard space to recreate Banker, Vendorand Borrower Transaction Sheets so they are visible to the entire classroom.
- Vendor Product/Price Tags for SportsWorld, CompuCity, and NewView Electronics
- 10 Blank Student Checks
- 10 Borrower Transaction Cards

PROCEDURE

1. Explain to the class that they are going to play a game which recreates the bank lending and money creation process they viewed in **How Banks Create Money.** Students should be familiar with the concepts, **required reserves** and **excess reserves.** They also should be familiar with the **M1** measure of the moneysupply — coins and currency in people's hands plus the funds available in checking accounts.

2. Recruit 10 of your students to act as Borrowers. Distribute one transaction card and one blank check to each recruit. Give the Borrower Transaction Sheet to the group and explain that each borrower will record his or her borrowing and check writing transactions on this Transaction Sheet.

3. Divide the remaining students into groups to represent the three Banks (Bank One, Bank Two, and Bank Three) and the three Vendors (CompuCity, SportsWorld, and NewView Electronics). Distribute the appropriate Transaction Sheets to each group and give each of the Vendors their product tags. Tell the Bankers and Vendors that they will keep track of their transactions on the Transaction Sheets. Tell Vendors to note which Bank — specified on the top of their Transaction Sheets — they should do business with.

4. To facilitate the class's understanding of the flow of the simulation and numerical transactions, have the Borrowers, Vendors, and Bankers, recreate their Transaction Sheets on the blackboard or large sheets of paper so that they are visible tothe entire class.

5. Introduce the simulation by giving the class a general overview of how the simulation works. Generally, borrowers follow the instructions on their transaction cards which tell them what they will buy, which bank to go to apply for a loan, and which vendor they will purchase their specified item from. As in **How Banks Create Money,** a $1,000 deposit will be introduced into the classroom banking system, initiating the rounds of multiple deposit and new checkbook money creation. Once the Bank (Bank One) receiving the $1,000 new deposit has set aside its required reserves it may loan an amount equal to the remaining excess reserves. Loans take the form of new checking accounts for the borrowers. Once approved, borrowers write their checks for the amount of the loan payable to the vendor. Upon receiving the check, the vendor gives the borrower the product tag which has the price and a picture of the borrower's purchase. Vendors endorse their checks and deposit them into their banks. All Banks, Borrowers, and Vendors record their transactions on their Transaction Sheets.

6. Explain to the class that you will lead them through a few rounds of loan transactions to help them understand the simulation and perform the numerical transactions. Depending upon your students' grasp of the simulation, you may want to lead them through all 10 transactions. **Figure 3** numerically depicts the entire simulation through the 10 transactions. Note that it is important for Bankers to subtract their loans from excess reserves available as a guideline for lending, to keep track of any excess reserves which they do not lend, and to tally this number with any additions to excess reserves that result from a new deposit.

7. To begin the simulation, inform the class that, currently in the classroomeconomy, the money supply consists of $1,000 in currency which you are going to deposit into Bank One. Ask Bank One to record the $1,000 under "deposits" on its Transaction Sheet. Ask the class to explain what has happened to the classroom money supply. (The total remains the same, $1,000, but now consists of $1,000in checking account funds.) Tell the class that the classroom reserve requirement is 10% and ask them to calculate Bank One's required reserves and excess reserves. ($100/$900) Bank One should record these amounts on its Transaction Sheet. Ask the class how much money Bank One has available for lending? ($900)

8. Ask Borrower 1 to read his or her transaction card out loud and proceed with its instructions. Borrower 1 requests a $500 loan from Bank One to pay SportsWorld for a new bicycle and helmet. Ask the class what form the loan will take for Borrower 1 (New checking deposit — emphasize that this checking deposit represents the first round of new money creation). Once the loan is approved, Borrower 1 records the amount of the loan on the Borrowers' Transaction Sheet, and then writes a check for the full amount of the loan, payable to SportsWorld. Borrower 1 exchanges the check for the new $500 bicycle/helmet product tag and then records the "amount of check spent" on the Borrowers' Transaction Sheet. Once SportsWorld has recorded the receipt of the check on its Transaction Sheet, the owners endorse the check and deposit it into Bank Two, their designated bank. Bank Two, in turn, records the new $500 deposit, and calculates its required reserves and excess reserves making sure to carry over any

excess reserves that weren't loaned in a previous transaction. (Since this is Bank Two's initial deposit, there are no carryover excess reserves.) The simulation continues with Borrowers 2 through 10 following the instructions on their transaction cards and each Banker and Vendor performing their jobs as outlined above.

9. **CONCLUSION:** Once all ten rounds have been completed, conclude the simulation by instructing **Bankers** to tally their "deposits," "required reserves," and "loans" columns. They also should calculate the balance in their "Excess Reserves Balance - Available for Lending" column. **Vendors** should tally their "receipts" and "deposits" columns. **Borrowers** should tally their "loan" and "amount of check spent" columns.

Perform the following arithmetic for your students to summarize the results of the simulation. (**Figure 3** illustrates the numerical transactions for the simulation.)

- Total of **required reserves** plus the **Excess Reserves Balance** for all three banks which should equal $1,000.
- Total **deposits** for all three banks which should equal $5,550.
- Total the **loans** and **amount of check spent** columns on the Borrowers Record Sheet which should equal $4,500.
- Total the **receipts** and **deposits** columns for each Vendor and then derive the cumulative total for each column for all three Vendors which should equal the Borrowers' totals, $4,500. This number, in turn, is $1,000 less than the total of **deposits** for all three banks, $5,500.

Ask the class how much new checkbook money was created through 10 rounds of lending? ($4,500 - This equals the cumulative total of new **loans** for all three banks.) How did they derive this figure and why? (Banks create money because loans take the form of new checking deposits for borrowers.) Ask the class what has happened to the M1 measure of the money supply? (The checking deposit component of M1 has increased by $4,500, the number of new loans.)

10. As a follow-up to the **How Banks Create Money** simulation, ask your students to interview a lending officer at their local bank to understand how to apply for a loan, how to qualify for a loan, the types of loans that are available, and the factors banks consider when approving loans.

FIGURE 3
HOW BANKS CREATE MONEY SIMULATION

BANK ONE TRANSACTION SHEET

DEPOSITS	REQUIRED RESERVES	EXCESS RESERVES	EXCESS RESERVES BAL. (AVAIL. FOR LENDING)	LOANS
$1,000 - initial deposit	$100.00	$900.00	$900.00	$500.00 [1]
			400.00	
300.00 [4]	30.00	$270.00	670.00	600.00 [5]
			70.00	
500.00 [7]	50.00	$450.00	520.00	500.00 [8]
			20.00	
400.00 [10]	40.00	$360.00	380.00	
$2,200.00	$220.00		$380.00 (Balance)	$1,600.00

BANK TWO TRANSACTION SHEET

DEPOSITS	REQUIRED RESERVES	EXCESS RESERVES	EXCESS RESERVES BAL. (AVAIL. FOR LENDING)	LOANS
$500.00 [1]	$50.00	$450.00	$450.00	$400.00 [2]
			50.00	
300.00 [3]	30.00	$270.00	320.00	300.00 [4]
			20.00	
600.00 [6]	60.00	$540.00	560.00	500.00 [7]
			60.00	
400.00 [9]	40.00	$360.00	420.00	400.00 [10]
$1,800.006	$180.00		$20.00 (Balance)	$1,600.00

BANK THREE TRANSACTION SHEET

DEPOSITS	REQUIRED RESERVES	EXCESS RESERVES	EXCESS RESERVES BAL. (AVAIL. FOR LENDING)	LOANS
$400.00 [2]	$40.00	$360.00	$360.00	$300.00 [3]
			60.00	
600.00 [5]	60.00	$540.00	600.00	600.00 [6]
			-0-	
500.00 [8]	50.00	$450.00	450.00	400.00 [9]
$1,500.00	$150.00		$450.00 (Balance)	$1,300.00

* Matching numbers correspond to sequence of transactions on the Borrower Transaction Cards. For example, in the first round of borrowing Borrower 1 requests a $500. loan from Bank One to pay for a new bicycle and helmet at SportsWorld. Once SportsWorld receives the $500. check as payment, it deposits this amount into Bank Two, its designated bank.

Borrower 1 Transaction Card	Borrower 6 Transaction Card
Borrower 2 Transaction Card	Borrower 7 Transaction Card
Borrower 3 Transaction Card	Borrower 8 Transaction Card
Borrower 4 Transaction Card	Borrower 9 Transaction Card
Borrower 5 Transaction Card	Borrower 10 Transaction Card

BANK ONE TRANSACTION SHEET

DEPOSITS	REQUIRED RESERVES	EXCESS RESERVES	EXCESS RESERVES BAL. (AVAIL. FOR LENDING)	LOANS

BANK TWO TRANSACTION SHEET

DEPOSITS	REQUIRED RESERVES	EXCESS RESERVES	EXCESS RESERVES BAL. (AVAIL. FOR LENDING)	LOANS

BANK THREE TRANSACTION SHEET

DEPOSITS	REQUIRED RESERVES	EXCESS RESERVES	EXCESS RESERVES BAL. (AVAIL. FOR LENDING)	LOANS

BORROWERS' TRANSACTION SHEET

AMOUNT OF LOAN	AMOUNT OF CHECK SPENT

COMPUCITY (BANK ONE)

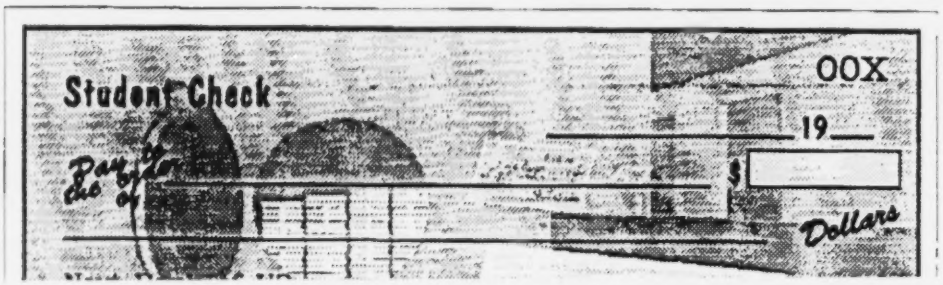
CHECK RECEIPTS	DEPOSITS

SPORTSWORLD (BANK TWO)

CHECK RECEIPTS	DEPOSITS

NEWVIEW ELECTRONICS (BANK THREE)

CHECK RECEIPTS	DEPOSITS



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Sportsworld

$500

BICYCLE & HELMET

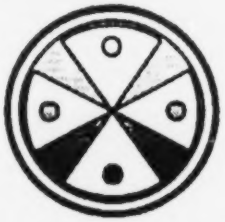
Sportsworld

$300

TRIPLE JUMMMP SHOES

Sportsworld

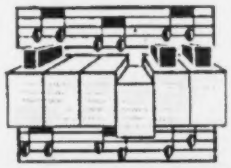
$600



FEATHERWEIGHT TIRES

NewView Electronics

$400



ELECTRONIC KEYBOARD

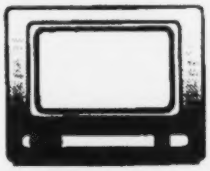
NewView Electronics

$600

STEREO SYSTEM

NewView Electronics

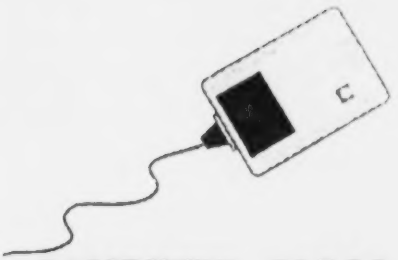
$500



COLOR TELEVISION

Compucity

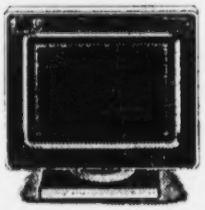
$300



COMPUTER CLASS

Compucity

$500



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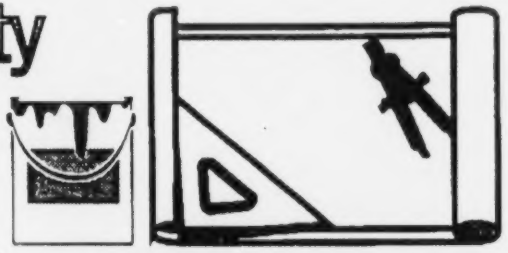
Compucity

$400



PAINTDESIGN SOFTWARE

Sportsworld

$400

WEIGHT SET

ACTIVITY 2: WHERE DOES THE "INITIAL DEPOSIT" COME FROM?

OBJECTIVE

Students will be able to understand where the intial deposit comes from to trigger new checkbook money creation in the banking system.

PROCEDURE

1. The sequence of money creation in **How Banks Create Money** is triggered by an "initial deposit" of funds outside of the banking system. Ask the class what determines how much money banks can lend to create new checkbook money (total reserves in the banking system — the amount of excess reserves that are available as a guideline for lending). Follow by asking what could be done to increase the amount of excess reserves. To stimulate the discussion, if changing the reserve requirement isn't brought up, ask the class what the impact on reserves and excess reserves in the banking system would be if the reserve requirement is raised? Lowered? (A higher reserve requirement lowers the amount of excess reserves that are available as a guideline for lending, while a lower reserve requirement increases the amount of excess reserves that are available.)

2. Review the M1 measure of the money supply and ask your students if this definition gives them any clues as to another way that bank reserves can be increased. (If the currency component of M1 is deposited into a checking account, there are more excess reserves in the banking system. This deposit of currency into a checking deposit would represent a redistribution of M1's components, with an increase in checking account funds and a decrease in currency.) To encourage the discussion, ask what would happen to banking reserves if Joe Penny decided to deposit the $10,000 he buried in his backyard into a bank account. (Total reserves in the banking system would increase as well as the amount of excess reserves which form the basis for lending and new checkbook money creation.)

3. Explain to your students that another source for this "initial deposit" ofreserves into the banking system comes from the actions of the Federal Reserve, specifically, the Fed's buying and selling of securities. Review the basic mechanics of what happens when the Fed buys/sells treasury securities using the **Economic Content** portion of this Unit as a resource. Display and discuss **Figure 2** to illustrate the impact of the Fed's purchase/sale of securities. Emphasize that when an individual writes a check, his or her account balance decreases while the check recipient's account increases – – the total amount of checkbook money remains thesame. In contrast, the Fed writes a check against itself to purchase securities which results in an increase in the amount of money in the economy.

4. Summarize the three sources for the "initial deposit" of new reserves intothe banking system. **Worksheets 1 & 2,** included in **Activity 3,** incorporatethe concepts

contained in the above discussion, and give your students a chance to practice their understanding of these concepts.

ACTIVITY 3: THE MONEY MULTIPLIER

OBJECTIVES

Students will be able to:

1. Calculate the maximum amount of new checkbook money the entire banking system can create when it receives an infusion of new reserves.
2. Calculate the maximum amount of checkbook money that is eliminated from the money supply when reserves are withdrawn from the banking system.
3. Explain the impact on the money supply and the economy when the Federal increases/decreases reserve requirements.

As **How Banks Create Money** illustrates, a deposit of new reserves into a single bank triggers a multiple expansion of new loans and checkbook money throughout theentire banking system. This multiple expansion process continues until all excess reserves have been absorbed into the banking system's required reserves. Assuming thatall banks receiving new deposits lend amounts equal to their total excess reserves and there are no cash withdrawals from customer's checking accounts it's possibleto calculate the maximum amount of new checkbook money that is created in the economy.

If all banks taking deposits lend an amount equal to their excess reserves and there are no cash withdrawals from customers' checking deposits, the maximum amount of newly created checkbook money will equal the reciprocal of the required reserve ratio times the initial infusion of excess reserves into the banking system:

(1/REQUIRED RESERVE RATIO X EXCESS RESERVES) = MAXIMUM AMOUNT NEW CHECKBOOK MONEY CREATED

The first component of the equation, the reciprocal of the required reserve ratio, is called the **money multiplier.**

PROCEDURE

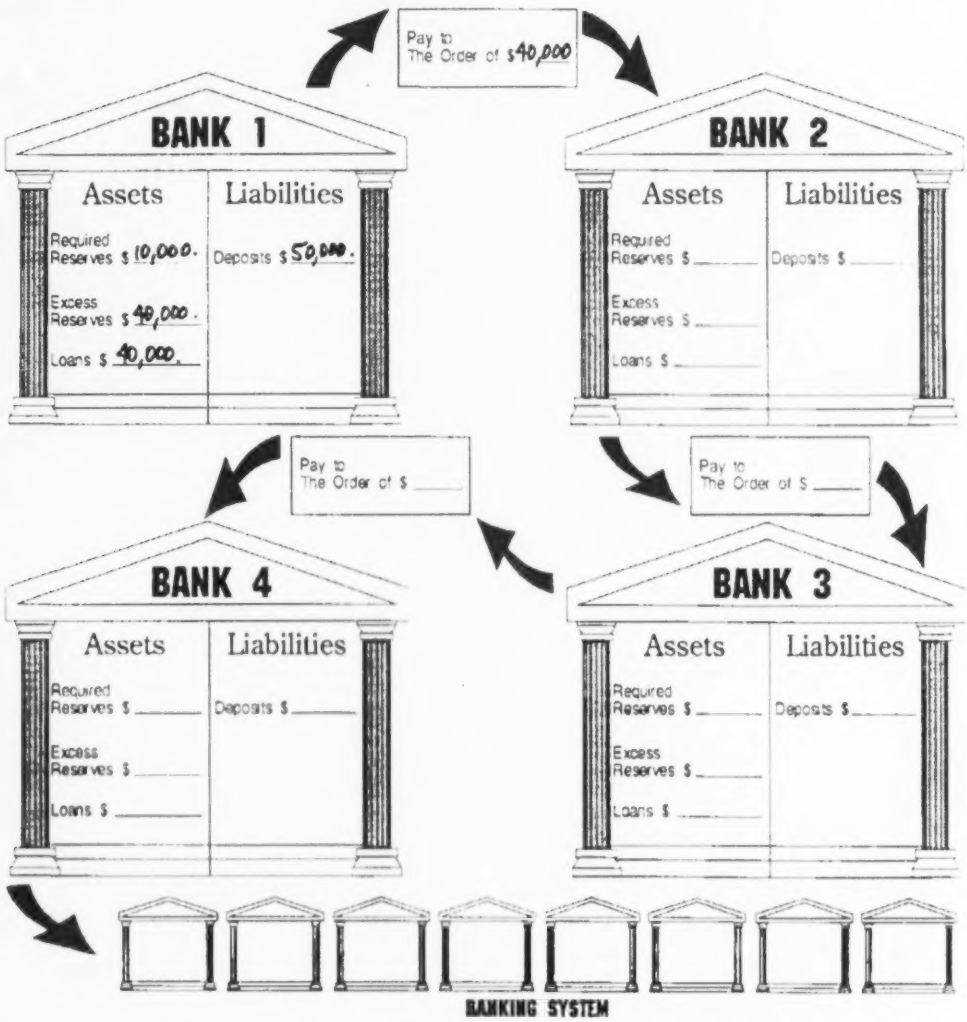
1. To familiarize your students with this mathematical equation, ask the class to calculate the maximum amount of new checkbook money created in **How Banks Create Money** with the initial deposit of $1,000 and a reserve requirement of 20 percent. Since the reserve requirement is 20 percent, excess reserves equal $800.00. 1/.2 x $800 = $4,000 In the **How Banks Create Money** economy, the $1,000 infusion of new reserves created $4,000 in new checkbook money. For the economy as a whole, the money supply increased by $5,000: The $1,000 initial deposit which added new reserves plus $4,000 in new checkbook money.

2. A change in the reserve requirement can have a significant impact on the money creation process since the money multiplier is defined as the reciprocal of the reserve requirement. From the equation, ask the class to describe the impact on the money supply when the Federal Reserve raises or lowers reserve requirements. (Higher reserve requirements contract the money supply, while lower reserve requirements expand the money supply.)

3. To enhance your students' understanding of how banks create money and the money multiplier equation, distribute copies of **Worksheets 1 & 2** to the class.

Worksheet 1 Part I

The Federal Reserve purchases $50,000 in U.S. government securities from XYZ securities Dealers to stimulate a sluggish economy. The Fed has set the reserve requirement at 20 percent. Your job is to trace the path of the Fed's $50,000 purchase through four loans transactions from First Bank through Fourth Bank. Fill in each bank's balance sheet with the amount of the new deposit, required reserves, excess reserves, and the amount of the loan. The first loan transaction is done for you. Make sure you deduct the amount of each loan from excess reserves. Assume that each bank lends an amount equal to its total excess reserves. After tracing the loan transactions, answer thequestions in Part II.



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Part II - Based on the information contained in Part I, please fill in the blanks or circle the appropriate answer as required. Assume that banks lend amounts equal to their excess reserves and that there are no customer withdrawals from their checking accounts.

1. The amount of new checkbook money introduced into the banking system by the Federal Reserve Bank's securities purchase is _____.

2. The total amount of new checkbook money created through four loan transactions is _____ with First Bank creating _____; Second Bank creating _____; Third Bank creating _____; and Fourth Bank creating _____.

3. In this example, the money multiplier (the reciprocal of the reserve ratio) is _____.

4. The maximum amount of new checkbook money that can be created through multiple deposit expansion is _____. (Hint: Use the money multiplier equationfor this calculation.)

5. The total amount of new checkbook money introduced to the banking system as a result of the Federal Reserve Bank's securities purchase equals _____.

Part II

1. The amount of new checkbook money introduced into the banking system by the Federal Reserve Bank's securities purchase is: $50,000.

2. The total amount of new checkbook money created through four loan transactions is $118,080 with First Bank creating $40,000; Second Bank creating $32,000; Third Bank creating $25,600; and Fourth Bank creating $20,480.

3. In this example, the money multiplier (the reciprocal of the required reserve ratio) is: 5.

4. The maximum amount of new checkbook money that can be created through multiple deposit expansion is: $200,000. (Hint: Use the money multiplier equation for this calculation.)

6. The total amount of new checkbook money introduced into the banking systemas a result of the Federal Reserve Bank's securities purchase is $250,000.

ANSWER SHEET
Part I Worksheet 1

WORKSHEET 2 - HOW BANKS CREATE MONEY UNIT REVIEW

PART I The following questions review the concepts contained in **How Banks Create Money.** Please fill in the blanks or circle the correct answer as required.

1. The U.S. banking system operates under a _____ which means banks are required to keep a fraction of their customers' deposits as _____ and they may lend an amount equal to the remaining _____.

2. If you add all coin and currency in people's hands plus the funds available in checking accounts, you get a measure of the nation's money supply that economists call _____.

3. When banks create money, they increase the _____ component of M1.

4. _____ limit the amount of new checkbook money that can be created when banks lend their excess reserves.

5. When the Federal Reserve Bank raises the reserve requirement, the money supply will most likely _____. Why?_____

6. When the Federal Reserve lowers the reserve requirement, they money supplywill most likely _____. Why?_____

7. Joe Smith has decided to cash in his paychecks and keep his money in his cookie jar until he wants to purchase something. By keeping his money in his cookie jar rather than in a checking account at a bank, Joe has increased/decreased the amount of excess reserves that banks can use as the basis for making loans to create new checkbook money.

8. When the Federal Reserve buys treasury securities, there are more/fewer excess reserves in the banking system to use as a basis to create new checkbook money.

9. When the Federal Reserve sells treasury securities, there are more/fewer excee reserves in the banking system to use as a basis to create new checkbook money.

PART II

The **Money Multiplier Equation** is used to calculate the maximum amount of new checkbook money the banking system can create from an infusion of new reserves. Use the **Money Multiplier equation** stated below to answer the questions which follow:

(1/REQUIRED RESERVE RATIO X EXCESS RESERVES) = MAXIMUM AMOUNT OF NEW CHECKBOOK MONEY CREATED

1. a. Assuming all banks lend amounts equal to the full amount of their excess reserves and their are no cash withdrawals from customers' checking deposits, calculate the maximum amount of new checkbook money created with a $1,000 new checking deposit and an 8% reserve requirement <ellipsis> With a $1,000 new checking deposit and a 10% reserve requirement <ellipsis>? With a $1,000 new checking deposit and a 12% reserve requirement? b. What is the impact on banking reserves and the amount of new checkbook money that banks can create when the reserve requirement is raised? lowered?

2. The Money Multiplier equation also can be used to determine the maximum amount of "deposit destruction" that occurs when reserves are withdrawn from the banking system. Using the Money Multiplier equation, can you calculate how much the checkbook portion of the money supply will decrease when the Federal Reserve sells a $100,000 government bond to a securities dealer which writes a check on its checking account to pay for the securities? The reserve requirement is 8%.

3. Frederick M. Miser has decided to cash in his $1,500 monthly paycheck and keep his money underneath his mattress rather than deposit his paycheck into a bank. What impact will Fred's actions have on the multiple deposit creation process? Using the money multiplier equation, can you numerically show the impact of Fred's actions on the checkbook portion of the money supply if the reserve requirement is 10%? What is the impact on M1?

WORKSHEET 2
HOW BANKS CREATE MONEY UNIT REVIEW - ANSWER SHEET

PART I

The following questions review the concepts contained in **How Banks Create Money.** Please fill in the blanks or circle the correct answer as required.

1. The U.S. banking system operates under a fractional reserve system which means that banks are required to keep a fraction of their customers' deposits as required reserves and they may lend an amount equal to the remaining excess reserves.

2. If you add all coin and currency in people's hands plus the funds available in checking accounts, you get a measure of the nation's money supply that economists call M1.

3. When banks create new money, they increase the checking deposit part of the M1 measure of the money supply.

4. Reserve requirements limit the amount of new checkbook money that can be created when banks lend their excess reserves.

5. When the Federal Reserve Bank raises the reserve requirement, the money supply will most likely decrease. Why? (Fewer excess reserves are available as a guideline for lending).

6. When the Federal Reserve lowers the reserve requirement, the money supply will most likely increase. Why? (More excess reserves are available as a guidelinefor lending.)

7. Joe Smith has decided to cash in his paychecks and keep his money in his cookie jar until he wants to purchase something. By keeping his money in his cookie jar rather than in a checking account at a bank, Joe has decreased the amount of excess reserves that banks use as the basis for loans to create new checkbook money.

8. When the Federal Reserve buys treasury securities, there are more excess reserves in the banking system as a basis to create new checkbook money.

9. When the Federal Reserve sells treasury securities, there are fewer excessreserves in the banking system as a basis to create new checkbook money.

PART II

The **Money Multiplier Equation** is used to calculate the maximum amount of new checkbook money the banking system can create from an infusion of new reserves. Use the **Money Multiplier equation** stated below to answer the questions which follow:

(1/REQUIRED RESERVE RATIO X EXCESS RESERVES) = MAXIMUM AMOUNT OF NEW CHECKBOOK MONEY CREATED

1. a. Assuming all banks lend amounts equal to the full amount of their excess reserves and their are no cash withdrawals from customers' checking deposits, calculate the maximum amount of new checkbook money created with a $1,000 new checking deposit and an 8% reserve requirement<ellipsis> (1/.08 x $920 = $11,500) With a $1,000 new checking deposit and a 10% reserve requirement<ellipsis> (1/.1 x $900 = $9,000) With a $1,000 new checking deposit and a 12% reserve requirement. (1/.12 x $880 = $7,333) b. What is the impact on banking reserves and the amount of new checkbook money that banks can create when the reserve requirement is raised? lowered? (Raising the reserve requirement decreases reserves, and, therefore, decreases the maximum amount of new checkbook money banks can create. Lowering the reserve requirement, increases reserves, and, therefore, increases the maximum amount of new checkbook money banks can create.)

2. The Money Multiplier equation also can be used to determine the maximum amount of "deposit destruction" that occurs when reserves are withdrawn from the banking system. Using the Money Multiplier equation, can you calculate how much the checkbook portion of the money supply will decrease when the Federal Reserve sells a $100,000 government bond to a securities dealer which writes a check on its checking account? The reserve requirement is 8%. (1/.08 x $920,000 = $11,500,000)

3. Frederick M. Miser has decided to cash in his $1,500 monthly paycheck and keep his money underneath his mattress rather than deposit his paycheck into a bank. What impact will Fred's actions have on the multiple deposit creation process? Using the money multiplier equation, can you numerically show the impact of Fred's actions on the checkbook portion of the money supply if the reserve requirement is 10%? (1/.10 x $1,350 = $13,500) What is the impact on M1? (The checkbook portion of M1 will decrease.)